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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/700,828	11/04/2003	Thomas W. Stone	10020907-1	6251
57299 7590 04/18/2007 AVAGO TECHNOLOGIES, LTD. P.O. BOX 1920 DENVER, CO 80201-1920			EXAMINER BELLO, AGUSTIN	
			ART UNIT	PAPER NUMBER
			2613	
SHORTENED STATUTORY PERIOD OF RESPONSE		MAIL DATE	DELIVERY MODE	
3 MONTHS		04/18/2007	PAPER	

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

**Office Action Summary**

Application No.

10/700,828

Applicant(s)

STONE, THOMAS W.

Examiner

Agustin Bello

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 28 April 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 19-21 is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Response to Amendment***

1. The Affidavit filed on 4/28/06 under 37 CFR 1.131 is sufficient to overcome the Doerr (U.S. Patent No. 6,754,410) reference.
2. Applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn.

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Doerr (U.S. Patent No. 6,956,987) in view of Volodin (U.S. Patent No. 7,031,573).

Regarding claims 1, 5, 11-14, Doerr teaches a method for optically switching/routing comprising the steps of: separating input optical radiation into distinct input channels (reference numeral 705-1 in Figure 7; reference numeral 805-1 in Figure 8); selecting desired distinct output channels (reference numeral 710-2 in Figure 7; reference numeral 810-2 in Figure 8); propagating said distinct input channels through a selectable switching/routing sub-system (reference numeral 750 in Figure 7; reference numeral 850 in Figure 8) in order to direct said distinct input channels to desired distinct output channels; recombining said desired distinct output channels (reference numeral 705-2 in Figure 7; reference numeral 805-2 in Figure 8).

Doerr differs from the claimed invention in that Doerr fails to specifically teach that the

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selectable switching/routing sub-system is grating based. However, Volodin, in the same field of optical switching, teaches that selectable grating based switching/routing sub-system are well known in the art (reference numeral 1020 in Figure 10). One skilled in the art would have been motivated to employ a selectable grating based switching/routing sub-system as taught by Volodin since such switches have been found to provide optical transparency for a wide range of wavelengths, provide excellent longevity, outstanding thermal stability, good dynamic range, excellent optical quality, low cost, a variety of shapes, and refractive index isotropy (column 4 lines 59-67 of Volodin). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to employ a selectable grating based switching/routing sub-system as taught by Volodin in the device of Doerr.

Regarding claims 2, 7, 8, Doerr teaches that the step of separating input optical radiation comprises the step of utilizing a separating sub-system comprising a pair of separating gratings (reference numeral 820-1 in Figure 8); and, wherein the step of recombining said desired distinct output channels comprises the step of utilizing a recombining sub-system comprising a pair of recombining gratings (reference numeral 820-2 in Figure 8).

Regarding claims 3, 15, Doerr teaches that the step of separating input optical radiation comprises the step of utilizing a separating sub-system comprising at least one Array Waveguide Grating (AWG) (reference numeral 820-1 in Figure 8); and, wherein the step of recombining said desired distinct output channels comprises the step of utilizing a recombining sub-system comprising at least one Array Waveguide Grating (reference numeral 820-2 in Figure 8).

Regarding claim 4, the combination of Doerr and Volodin teaches that the grating based switching/routing sub-system comprises a volume holographic grating based switching/routing sub-system (reference numeral 1020 in Figure 10).

Regarding claim 6, the combination of Doerr and Volodin teaches that the selectable switching/routing sub-system includes at least one pixellated switchable component (reference numeral 850 in Figure 8 of Doerr; reference numeral 1020 in Figure 10 of Volodin).

Regarding claim 9, the combination of references differs from the claimed invention in that it fails to specifically teach that the at least one of said first separating diffraction grating, said second separating diffraction grating, said first recombining diffraction grating, and said second recombining diffraction grating comprises a volume holographic grating. However, as noted above, Volodin teaches that the use of volume holographic gratings as combining and separating gratings is well known in the art. One skilled in the art would have been motivated to employ volume holographic gratings as the combining and separating gratings of the system for the advantages presented above. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to employ volume holographic gratings as combining and separating gratings in the system of the combination of references.

Regarding claim 10, Doerr teaches that said first separating diffraction grating is substantially parallel to said second separating diffraction grating, and, said first recombining diffraction grating is substantially parallel to said second recombining diffraction grating (inherent in the AWGs of Doerr).

Regarding claim 16, Doerr teaches at least one microlens array (reference numeral 830-1, 830-2 in Figure 8; reference numeral 305 in Figure 3).

Regarding claim 17, the combination of Doerr and Volodin teaches anamorphic optics for circularizing the waveguide outputs of the separating AWG (reference numeral 830-2 in Figure 8 of Doerr; reference numeral 1011-1014 in Figure 10 of Volodin).

Regarding claim 18, both Doerr and Volodin teach means operably connected to said selectable switching and routing sub-system for controlling the state of each pixels from a plurality of pixels; said controlling means being capable of enabling the selecting of desired distinct output channels (column 2 lines 32-34 of Doerr; column 3 line 12 of Volodin).

***Allowable Subject Matter***

5. Claims 19-21 are allowed.

***Response to Arguments***

6. Applicant's arguments filed 1/17/07 have been fully considered but they are not persuasive. The applicant argues that the Bragg diffraction gratings taught by Volodin are neither pixellated nor controllable. However, the examiner disagrees.

First, Doerr clearly teaches a pixellated switchable component in the form of mirror/shutter array 750, 850 seen in Figure 7 and 8. Furthermore, Volodin also teaches a pixellated switchable component in that the VBG has the ability to separate each wavelength, or stated differently, the smallest whole component of the multiplexed optical signal from the multiplexed optical signal. Moreover, Volodin's VBG is switchable and therefore controllable in that Volodin specifically discloses that the transmission VBG allows tuning of the central wavelength of the filter by adjusting the incident angle of light upon the VBG. As such, the wavelength to be diffracted is switchable and controllable based on the incident angle of light

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upon the VBG. This concept is further reinforced by Volodin's bi-directional arrow shown in Figure 10 along side the term "SWITCH."

Regarding the controlling means of claim 18, when given the broadest reasonable interpretation, claim 18 merely requires that a "means" be operably connected to the selectable switching and routing subsystem as some point in time, but fails to positively recite that the control of pixels occurs when the optical system is in use, or in the processes of switching, adding, or dropping optical signals. As such, the passages noted by the applicant clearly meets the limitations of the claimed invention in that at some point in time, namely prior to being deployed in the field and during the manufacturing process, a means, i.e. the mask that controls the filter response, is operably connected to the selectable switching and routing subsystem for controlling the state of each of the pixels from the plurality of pixels, thus enabling the selection of a desired output, i.e. the filter response, of the distinct output channels.

As to applicant's argument that replacing micromachine mirror array with the transmission VBG of Volodin would result in little likelihood of success, the examiner notes that the applicant's point is well taken. However, the examiner also notes that at no time does the non-final office action to which this amendment is responsive make reference to replacing the micromachine mirror array with the transmission VBG, since doing so would destroy the functionality of the device of Doerr. Rather, the non-final office action specifically noted the reflective VBG 1020 which, in the examiner's opinion, could easily replicate the functionality of the micromachine mirror array of Doerr. Furthermore, and in response to the filed amendment, the examiner has further noted that Figure 7 also meets the limitations of the claims and also provides for the use of Volodin's transmission VBG.

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In response to applicant's argument against the rejection of claim 10, the examiner notes that the operative word in the claim is "substantially." In the examiner's opinion, the gratings taught by Doerr are substantially parallel.

***Conclusion***

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Agustin Bello whose telephone number is (571) 272-3026. The examiner can normally be reached on M-F 8:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on (571)272-3022. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

A handwritten signature in black ink, appearing to read 'A. Bello', with a stylized flourish at the end.

Agustin Bello  
Primary Examiner  
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AB